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An Outbreak of Vibrio cholerae in 2012, Kathmandu, Nepal

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Globally, there are an estimated 3-5 million cholera cases and 100,000-120,000 deaths due to cholera each year [1]. Vibrio cholerae is the etiologic agent of cholera and is mainly spread through contaminated drinking water. It can be fatal within hours, if rehydration is not managed promptly. Inadequate water supplies, poor sanitation and poor hygiene behaviors are largely responsible for cholera diarrhea in resource poor settings. Diarrheal diseases have long been recognized as a major public health challenge in Nepal, putting diarrheal diseases in the second highest research priority area among infectious diseases [2]. Though cholera is considered to be endemic in south Asia, there have been relatively few studies on cholera to date in Nepal. We here report *V. cholerae* in hospitalized patients with acute diarrhea during July-August, 2012, admitted to Sukraraj Tropical and Infectious Disease Hospital (STIDH), Kathmandu, Nepal.

V. cholerae O1 or O139 isolated from feces of any patient with diarrhea is defined as cholera. Stool specimens were inoculated on Thiosulphate Citrate Bile Salt Sucrose Agar (TCBS) (i-Media, Mumbai, India) and incubated at 37°C for 24 hours. Subcultures were further done on Mac-Conkey Agar (MA) and incubated overnight at 37°C. The colonies were analyzed and biochemical tests were performed. Culture positive specimens were agglutinated with specific antisera for *V. cholerae* 01, Ogawa and Inaba serotypes according to manufacturer's instructions (Denka Seiken, Tokyo, Japan). Antibiotic susceptibility test of isolates was determined using Muller Hinton agar (Hi-media, Mumbai, India). Tetracycline (30 mcg), ciprofloxacin (5 mcg), chloramphenicol (30 mcg) erythromycin (15 mcg), co-trimoxazole (25 mcg), and ampicillin (10 mcg) were used to identify the patterns of susceptibility of cholera to antibiotics, and interpreted as sensitive, intermediate or resistant according to the Clinical and Laboratory Standards Institute (CLSI).

A total of 503 patients with acute diarrhea were hospitalized at Sukraraj Tropical and Infectious Disease Hospital during the study period. Of these, 21 (4.1%) were culture positive for V.cholerae. All culture positive *V. cholerae* specimens were found to be O1 Ogawa serotype. Cholera cases were most frequently observed (86%) from mid-July to mid-August (Figure 1). The median age of the patients was 25 years (range, 11-78). The most affected age group was between 15 and 44 (86%) years old (Figure 2). Twelve patients (57%) were female. Patients were treated with antibiotic and intravenous (IV) fluids for a median of 1 day (range,1-4), and recovered uneventfully. All isolates were sensitive to tetracycline (100%), followed by ciprofloxacin (76%) and chloramphenicol (66%). The majority of isolates were equally resistant to co-trimoxazole and ampicillin (90%) (Figure 3).

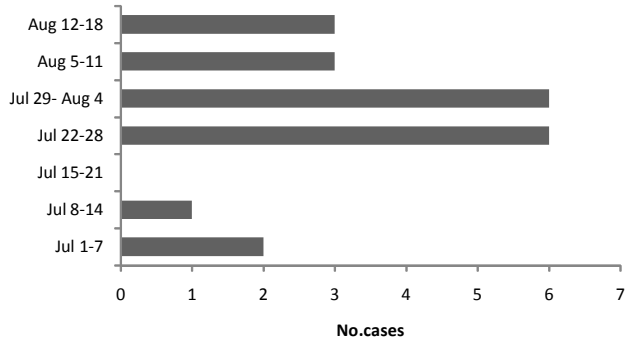

Figure 1: Number of laboratory-confirmed *Vibrio cholerae* cases at Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal, July-August, 2012.

Poor conditions of water supply and sanitation systems continue to remain a huge public concern in Nepal. Not surprisingly, therefore, diarrheal diseases have been frequently observed during rainy periods [3,4]. In the present study, cholera was mostly detected between mid-July and mid-August, the rainiest monsoon period in Nepal. All *V. cholerae* isolates were O1 Ogawa, and showed high sensitivity to tetracycline followed by ciprofloxacin and chloramphenicol and moderate sensitivity to erythromycin. However, the isolates were equally resistant to co-trimoxazole and ampicillin. Of note, high-level resistance to ampicillin found in the present study, is contrary to the results of previous studies [3,5] . Spontaneous mutations in the bacterial chromosome due to irrational use or incomplete course of

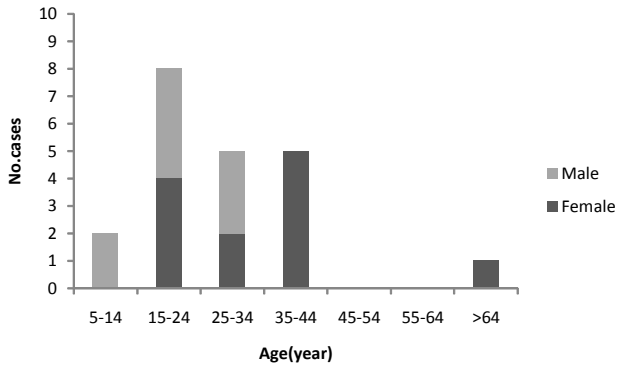

Figure 2: Distribution of *Vibrio cholerae* cases by age (year) at Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal, July-August, 2012.

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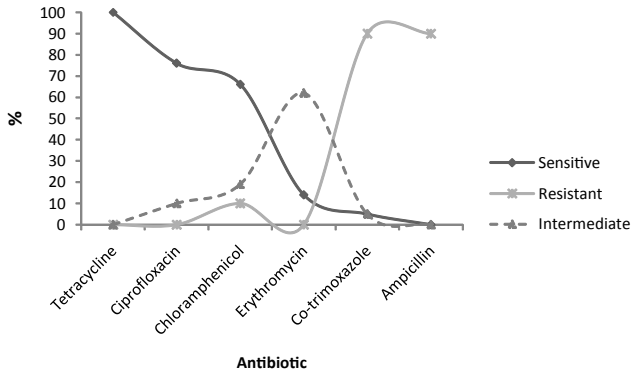

Figure 3: Antibiogram patterns of Vibrio cholerae isolates.

antibiotics could be possible explanations of changing antibiogram profile over the years [6]. Sequencing could provide useful information about evolution, strain diversity and geographical origin, but outside the limits of the present study. Nevertheless, it can be assumed that the strains circulating in Nepal might be concurrently circulating in India and neighboring countries [7].

Although several pathogens are known to cause acute diarrhea in humans, it is, vitally important to monitor the presence of *V. cholerae* among patients with diarrhea, particularly in resource poor settings because it can quickly lead to severe dehydration or even death within a few hours and is highly contagious. Continuous monitoring, therefore, is a critical in Kathmandu and including other parts of the country, enabling immediate disease intervention, if future outbreaks occur.

Acknowledgments

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Conflict of Interest

All authors declare to have no conflict of interest.

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